UNIVERSITAT JAUME I

“WEALTH INEQUALITY IN SPAIN”

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Abstract

This paper analyzes the evolution in inequality in wealth between 2002 and 2011 in Spain, using data from the Spanish Survey of Household Finances. Spanish households’ net wealth, especially housing equity, has substantially increased over the years, especially from 2002 to 2005. We draw the Lorenz curve and we compute percentiles, the Gini coefficient, the P90/P10 ratio and the P90/P50 ratio to study wealth inequality for the variables total net wealth and wealth net of housing equity in the four years of the Survey: 2002, 2005, 2008 and 2011. Our results show that percentiles and the median net wealth (excluding or not the housing equity) evolved similarly, driven mainly by the top percentiles, and there are lower levels in inequality if the housing equity is considered.

Keywords: EFF, net wealth, inequality, crisis, Spain, families.

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1. Introduction

The distribution of wealth is the key to understanding the dynamics of economic growth along with the welfare of the population. Over recent years, progress in most of the industrialized economies along with the modernization of the financial system, has generated substantial changes in patterns of saving, financing and investment of households, thus creating inequalities in the distribution of wealth among families.

The interest for the equity in the distribution of wealth and the role of public policies has been revived from different areas of research and from international agencies worldwide. So named above, along the grave economic situation that our country is currently going through, the deterioration of family incomes, the fall in aggregate demand, the difficulties of survival of businesses and falling revenues, is strengthening the interest on the interaction between the distribution of wealth and economic growth.

The intense and prolonged recession in many developed countries, along with the process of economic globalization is driving some profound changes patterns of income distribution and global wealth. Therefore, the Bank of Spain, in 2002 decided to start a project of surveys, concretely the Spanish Survey of Household Finances (EFF) in order to know the patrimonial situation and the financial decisions of the families of our country, and along this investigation, these surveys are used to know how the net wealth is distributed.

In order to try to identify and quantify the effects that the financial crisis is having on the distribution of the wealth of Spanish families, the main objective of this research is to analyze which has been the evolution of wealth and wealth inequality of families in Spain during the period from 2002 to 2011. That is why in view of the interest to know the impact of wealth inequality in Spain, along this work it has been shown firstly that the globalization and the financial crisis are largely the causes of that inequality of wealth that has increased over the years. And secondly, the median net wealth excluding housing equity is much lower than the median total net wealth on each year, indicating that the main residence of the families and their debts have a significant weight on the net wealth.

The choice of this investigation is due to its importance since the crisis has generated a great interest about the inequality of wealth in Spain. Moreover, this problem affects to the Spanish population and creates discomfort in a society and it is a cause to be determined, clarified and explained to increase society awareness of existing wealth inequalities. The topic has also been chosen for its relevance and importance in the world and because it is a priority and an important and significant problem for the Spanish population.

A methodological problem based on the study of the wealth inequality in Spain has been the difficulty of finding comparable datasets (a number of different households' surveys has been started and interrupted over the years), and consequently the period that has been researched is relatively small and covers four years ranging from 2002 to 2011.

Another limitation was the difficulty of achieving a high response rate from the surveyed population, because the population answered on the basis of their interests, or sometimes they do not have sufficient knowledge to respond optimally, so that, the information may be biased. Moreover, in order to solve the problem of low response by the richest people, in the surveys it has been included an oversampling of the rich in order to have a representative sample of the population.

The work has been divided into six sections, besides this first introductory section. The second section is a brief review of the literature on wealth distribution. In the third section they are discussed various methods that will be used to measure inequality. The fourth section discusses some relevant aspects of the development of the Spanish Survey of Household Finances, which are more detailed in Bover (2004), and data sets for the study are described. The following section describes the obtained results on the net wealth of households and the evolution in inequality over the period studied. Finally, in the last section we present the conclusions obtained on the work.

2. Literature review

I. Wealth inequality of Spain

In Spain and in most of the countries, there is greater inequality in wealth than in earnings and revenues, so that over the years the interest on how wealth is distributed and which level of wealth inequality exists has increased. However, which are the models that try to study the unequal distribution of wealth? Or which are the determining factors of the concentration of wealth among the different families?

In this section, we are going to describe some authors who have based their works in the study of the unequal distribution of wealth and the models that they have used to do it. But, unfortunately, sometimes it is difficult to find an adequate data and some clear theories.

In order to develop a theory of value and distribution, David Ricardo, an English economist and considered one of the pioneers of modern macroeconomics, in his most important book *Principles of political economy and taxation (1817)* said that “the main problem of political economy is to determine the laws that regulate the distribution” (Ricardo,1817, p.1).

With the aim of knowing which models are trying to study the inequality of income and wealth, in 1905, Max Otto Lorenz, an American economist, in his book *Methods of measuring the concentration of wealth* proposes some curves indicating that the bulging of these curves is a measure in inequality in the distribution. Seven years later, in 1912, Corrado Gini, an Italian statistician, proposes a coefficient that has his name as an indicator to measure inequality.

In 1929, G. H. Hardy, J. E. Littlewood and G. Polya published their first results of inequalities in an article in the journal “The Messenger of Mathematics”. They are the precedents of their transcendent book *Inequalities*, whose first edition appeared in 1934.

Later, in the fifties of the twentieth century, certain economists such as Lewis (1954) and especially Kuznets (1955), made the first works where the relationship between growth and inequality was proposed. Kuznets develops in his work the most completed and accepted theory in inequality until today.

From 1970 there have been so many economists interested on the problem in inequality and they have published some works about the distributions of the income and the wealth, starting with Atkinson (1970), Sen (1973) and Kolm (1976) whose main objective was to place the analysis and the empirical measurement in inequality in the context of the economics of welfare.

It was around this time when there was an increase in inequality (concretely from 1970) especially in the developed countries, so that, it was produced an increase of the interest for studying inequality.

Nowadays there is a lot of difference in the distribution of the wealth between developed and developing countries, but within countries, there is a difference between the distribution of wealth among families. Bover, O. (2004), in her work *Wealth inequality and household structure: US vs. Spain,* try to study the link between culturally inherited structure and wealth distribution in international comparisons using household data for the US and Spain. She argues that the prevailing family systems in each country are important to understand the differences in the wealth inequality between countries. She studies the implications of the differences in the family structure for the comparison of wealth inequality between the two countries, one with weak family ties (US), and another with strong family ties (Spain). In order to do this, for these countries she uses in her study two types of surveys, the SCF 2001 for US and the EFF 2002 for Spain. To assess the impact of the household structure on the differences in wealth distribution between the US and Spain, Bover estimates non-parametrically the counterfactual distribution that would have prevailed in the US if the demographic characteristics of households had been similar to those prevailing in Spain. Imposing the Spanish household structure to the US wealth distribution had a little effect on summary measures in inequality. She studies the differences between the two countries using quantile regressions.

In 2009, Alvaredo, F. and Saez, E. elaborated series on top shares of income and wealth in Spain using personal income and wealth tax return data, and they studied the evolution of the top income and wealth shares between 1930 to 2005. They affirmed that income and wealth inequality were higher in the 1930s, fall sharply during the first decade of the Franco dictatorship, and then remain stable and low till the 1980s, and have increased since the mid 1990s.

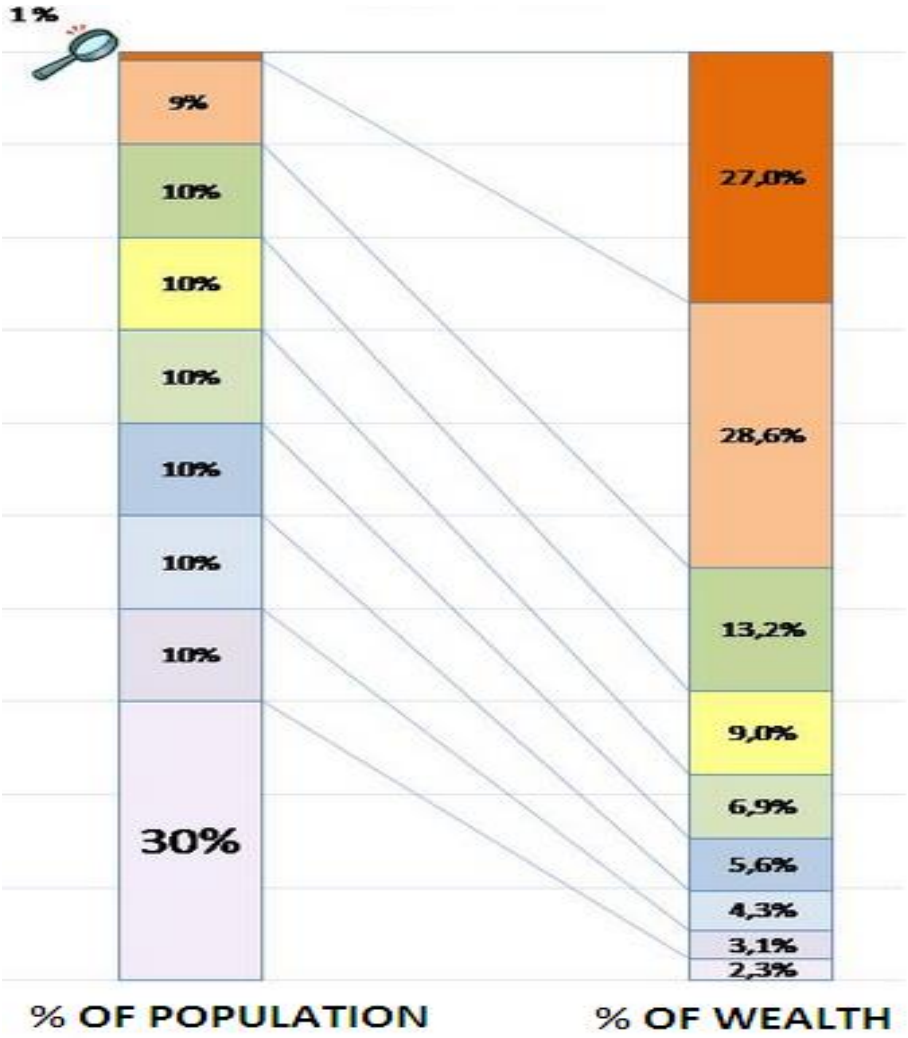
Recently, especially in 2014, Piketty, a French economist specialized in economic inequality and income distribution, wrote the book *Capital in the Twenty-First Century* where he shows how the concentration of wealth is produced and its distribution during the last 250 years. Thomas Piketty, in his book, analyzes a unique collection of data from twenty countries, ranging as far back as the eighteenth century, in order to uncover key economic and social patterns. He shows that modern economic growth and the diffusion of knowledge have allowed us to avoid inequalities on the studies predicted by Karl Marx. Piketty says that the political action has curbed dangerous inequalities in the past and may do it again. On the book, the author argues that when the rate of capital accumulation is growing faster than the economy, then the inequality increases.

To avoid what he calls a "patrimonial capitalism", Piketty proposes a progressive taxation and a global tax on wealth in order to help solving the current problem of rising inequality. In the study, data from tax records allow to do an analysis of the distribution of income by percentile, watching the revenues that have been distributed, with a special emphasis on the top (ranging from 0'01% to 10%), showing their income as part of the national wealth. Moreover, these data are supplemented with the analysis of national accounts to show the source of the income and capital concentration , being able to perform a functional analysis of income depending on whether the income comes from rents , income from capital or work, and to observe the tendency to accumulate capital as public or private, and whether national or foreign. This data set provides the ability to link the unequal distribution of income with capital and growth.

The data set has allowed a description of the performance of a capitalist economy, with special emphasis on the evolution of the distribution and the behavior of wealth within the system and its implications. This is possible due to the length of the study period covered by the historical series, achieving analyzed phenomena and patterns that in a smaller series would not be noticeable.

Following the statistical approach proposed by Piketty, and with the latest data published by Credit Suisse in 2014, the following data on inequality in Spain are obtained and shown in the figure below.

Figure 1: ***Distribution of wealth in Spain.***



Source: Prepared from Global Wealth Datebook 2014. Credit Suisse.

For Piketty there are three groups that are particularly relevant in the study in inequality. One of them is the last 10th decile, which in Spain holds a large majority of economic power: 55'6 % of the total wealth. Growing within that decile, wealth grows exponentially: 1% of the population owns 27% of the combined wealth. This means that 10% of the richest 10% accounts for about half of the wealth of that subgroup, and so up gradually. In those groups there are people who control economic power in Spain, through strategic representatives and well-paid, and also there are people who have a growing political power. For Piketty, in a second group of interest, he tries to observe the income of the four core deciles (from percentile 20 to 60), the 40% that could be considered representative of a large middle class. In Spain, the middle class has 19'9 % of the wealth. Finally, in the third group proposed by Piketty, the top five deciles are added to know the proportion of the wealth that have the poorest population.

II. Wealth inequality and financial crisis in Spain

Until 2007, a lot of people lived beyond their means, without actually assessing how they were living. Everything changed at the end of 2007. The economic and financial crisis hit our country hardly. The growth phase of the Spanish economy was based on the construction industry, which was the driving force of economic development since 1997 (Matea y Sánchez, 2006). But unfortunately, the construction fell.

The burst of the property bubble fuelled by the credit boom restricted the lending capacity of the banking sector. The country was severely affected by the bursting of the housing bubble in 2008, which caused a collapse in the sales and then in the prices. When the property bubble exploded, there was a contraction in demand and the economy entered in recession.

The financial crisis took place after five years of high liquidity in the financial market. This has been reflected in the increase of monetary aggregates, causing an overcapacity, and reflected in the ability to convert any financial assets into cash immediately without significant loss of value[1].

The impact of the crisis has been longer in Spain than in most OECD economies. Its main effects included the collapse of the construction sector. As a result of the financial collapse, the credit of the companies and the credit of the families decreased, so they were obligated to initiate a process to reduce the debt. This fact provoked a contraction of the internal demand, a strong fall of the production, a decreased in GDP, a larger government deficit and a serious increase in unemployment. Spain has made substantial progress in addressing these challenges.

The downsizing of the construction sector, while still incomplete, is largely permanent. The current account deficit may have improved, but the debt burden of the private sector, especially among households, is still high, limiting the future economic growth.

As mentioned above, the intense and prolonged recession that lives in many developed countries with the process of economic globalization is driving changes in the distributions of income and wealth. Moreover, the arrival of the recession and the decline in economic activity has not had a uniform effect on inequality of wealth and income in the families of each country.

[1] T. Adrian y H. Dhin (2008), *Liquidity and financial cycles*, BIS Working Papers, nº 256, july.

In Spain, due mainly to the case of real estate crisis, these impacts have marked an important shift in the distribution of the household income, and thus possibly in the distribution of wealth, especially the middle and low class. Moreover, another important effect of the crisis has been the destruction of employment.

One of the main problems in Spain is the difficulty for the economy to recover. From 2007 to 2011, the Spanish economy only was recovered the 20% of the decrease in production, in contrast, employment has lost about 10% (Eloisa and Juan Peñalosa, 2012). Moreover, Spain became the second eurozone country with the highest public deficit, that is, in 2014 there was approximately 6% of the GDP (The World Bank, 2015).

Nowadays, the aim of Spanish economy is trying to reform the constitutional framework of the European Union and designing mechanisms to combat the financial crisis. These objectives allow the economic adjustment will be perform more accurately taking into account changes in prices and costs and thus, reducing its impact on employment and on economic activity.

For this reason, the effects of the crisis on the distribution of wealth have motivated me to go to study the inequality in the net wealth of Spanish households using data from before and after the financial crisis, specifically in the available years (from 2002 to 2011), and also to study the inequality in the net wealth excluding housing equity.

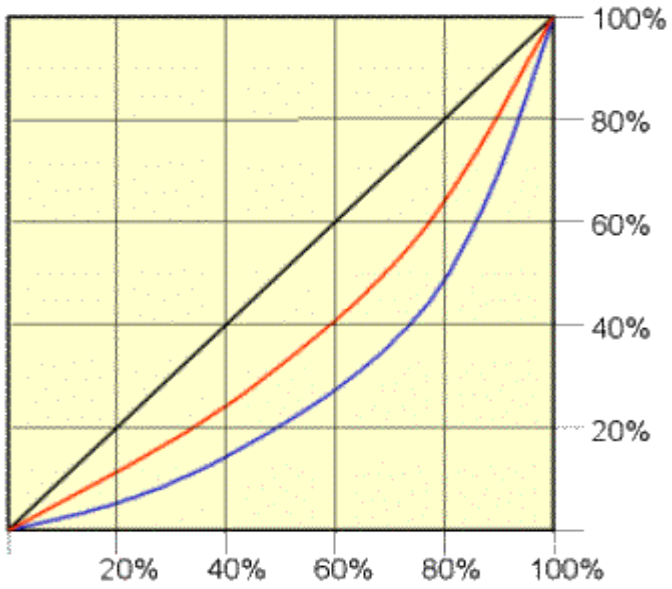
3. Measurements in inequality

The main objective of the work is to assess the inequality of wealth that exists in Spain since 2002, and to carry out such study a kind of instrument is needed, which will allow us to summarize a set of figures in order to enable comparisons between different situations based on their level in inequality. To do this, the most common way is using the Gini coefficient and the Lorenz curve. Moreover, economists study inequality using the ratio between 90/10 and 90/50 percentile. For this reason, we are going to work with them through all this study and then we are going to explain in detail each one of them.

In order to compare different distributions of total net wealth, we can compute percentiles. A suitable tool to perform this type of analysis is the Lorenz curve (1905). This curve is the graphical representation of a function that can provide detailed information about levels of participation by quintiles for a given wealth distribution. This function is constructed in the following way: individuals are sorted according to their level of wealth, from minor to major, and it represents, for the different cumulative proportions of the ordered population (from 0 to 1 on the horizontal axis), the cumulative proportion of total wealth owned by individuals (from 0 to 1 on the vertical axis).

The Figure 2 below shows an example of the representation of the net wealth at two different times, one year is represented in red and the other is represented in blue. As we can see, in the case of the red year, the poorest 40% owns more than 20% of the wealth. Nevertheless, in the blue year, the poorest 40% of the population has a lower net wealth than the 20% of the total population.

Figure 2: *The Lorenz curve*.



Source: own elaboration.

The central diagonal line in the Figure shows the location of a year in which every family had exactly the same wealth, which corresponds to the absolute fairness, or what is the same, a zero Gini coefficient. So, the closer to the diagonal is the Lorenz curve, the more equitable will be wealth in the year to study.

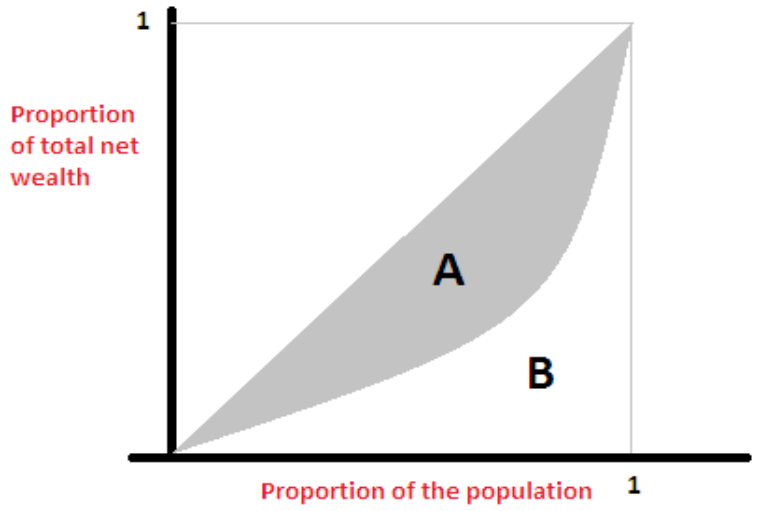
A very important feature that complies with the Lorenz curve is that all the curves pass through the points (0,0) and (1,1). If all the families have the same level of wealth, the accumulated total wealth and the population will be the same. Therefore, in this case, the Lorenz curve coincides with the diagonal centre. This diagonal is called the line of perfect equality. The other extreme case is the maximum concentration, where only one person has the total of the net wealth. In this situation the Lorenz curve coincides with the horizontal axis and ascends vertically to the point (1,1).

The Gini coefficient is attributed to the economist Corado Gini (May 23th, 1884 - March 13th, 1965). The coefficient is used to measure inequality or equality referred to the wealth or income of a country. Throughout the work, the Gini coefficient is used to measure inequality of wealth in Spain and to know how far away Spanish households wealth distribution is from a perfectly equitable distribution of wealth among families in the economy. In the calculation of the Gini coefficient, a result is obtained in a range between zero and one. The closer the value is to one, the greater concentration of wealth will be, or what is the same, there will be a perfect inequality where families will

have a high wealth while others will have little wealth. On the other hand, when the value of the Gini coefficient is close to zero, the distribution of wealth is more equitable. In the case where the Gini coefficient is zero, there would be a perfect distribution, which means that all the families would have equal wealth.

The Gini index has a simple and intuitive interpretation of the Lorenz curve. Its value allows to measure the area between the Lorenz curve of a distribution and the line of perfect equality as a proportion of the total area below this line. It is a way to quantify the proximity (or farthest) of a distribution regarding the situation of perfect equality. So that, "A" is referred to the area that forms the bisector (distribution) and the curve that draws the territory of study distribution, and "B" is referred to the area underneath this curve, so that the Gini coefficient is equal to A / (A + B) and this can be observed on the next Figure 3.

Figure 3*: Area to calculate de Gini coefficient.*



Source: own elaboration.

The consideration of other measurements in inequality, such as 90/10 and 90/50 percentile are useful to evaluate other aspects in inequality. Moreover, the P90/P10 ratio reflects how much richer is the 90% of the richest population compared to 10% of the poorest population. The P90/P50 reflects how much richer is the 90% of the richest population compared to 50% of the poorest population.

4. Data

In order to obtain direct information on the financial situation of the Spanish families and in order to prepare some studies on investment decisions and household financing, the Bank of Spain has launched a survey called "Spanish Survey of Household Finances" (EFF).

It is a pioneer survey in Europe, conducted for the first time in 2002 and whose usefulness led central banks of the euro area to conduct a similar survey in many other European countries. This type of survey is used to study the evolution in Spain of the net wealth and to obtain information detailed of the patrimonial situation of families as well as their financial decisions relating to their household incomes, debts, expenditure and assets. For the study of the evolution of wealth the years used are 2002, 2005, 2008 and 2011, these years are the only available.

The realization of this type of survey enables a better understanding of the whole Spanish economy and an appropriate design of the public policies. But on the negative side, one defect of those surveys is the fact that they have recently begun to make them, so there are no long time series enough to study inequality.

One of the most important features in this type of survey is that it is considered of great importance to have a representative sample of the population and for this purpose there is an oversampling of the Spanish households with the highest levels of wealth, which allows the measurement in inequality (such as for example the Gini coefficient) with good accuracy. A reason why this oversampling is incorporated is because the distribution of wealth is highly asymmetric so that some assets are only held by a small part of the population, so considering a representative sample of the population and aggregate wealth of the economy is considered of significant importance to consider.

Another problem with surveys of households is that the information may be biased, either because the respondent answers based on their interests or because they do not have sufficient knowledge to respond optimally. Moreover, it is difficult for the richest people to answer honestly the surveys. And on the other hand, sometimes they do not take into account the homeless people. The oversampling was achieved thanks to the collaboration of the National Institute of Statistics, thus it has a single frame for the sample population, to ensure the representativeness of the information and finally to obtain the information about the behavior of households with a higher level of wealth.

The main objective of the work is trying to study the evolution of the net Spanish household wealth, which is obtained from the sum of the value of the tangible assets and the value of financial assets less the value of debts.
Firstly, REAL ASSETS are defined as:

-the main residence

-other real estate properties

-jewelry, works of art and antiques

-the value of the businesses related to self-employment

For each self-employment job of each household member, the values of the real estate properties and buildings subtracting the value of the assets already declared as real estate properties are added to the values of business including machinery and vehicles (here we do not subtract vehicles already included because vehicles are not considered wealth if they are not part of a business).

FINANCIAL ASSETS consist of:

-accounts and deposits usable for payments

-listed shares

-unlisted shares and other equity

-fixed income securities

-mutual funds

-house purchase savings accounts and accounts not usable for payments

-pension schemes

-life insurance

-pension schemes including unit-linked or mixed life insurance

-other financial assets

DEBTS are classified depending on the type of loan. Outstanding debts of loans requested for the acquisition of the main dwelling and acquisition of other real estate (different than the main dwelling).

To obtain the value of the total outstanding debt it is included the value of the outstanding debts from loans used to purchase their main residence, the value of the outstanding debts from loans used to purchase other real estate properties different from the main residence, the value of the outstanding debts from mortgages and other loans with real guarantee, the value of the outstanding debts from personal loans and the value of the other outstanding debts.

Finally, households' TOTAL NET WEALTH is given by gross wealth (real assets plus financial assets), net of the accumulated debts.

5. Results

I. Data description

The households' median net wealth (not to be confused with the mean) is that value of net wealth such that half of the households have less wealth than that value and the other half have a greater wealth. The figures shown below are calculated in "real Euro 2006". This year is chosen as the base year because it is in the middle of the studied period (2002-2011).

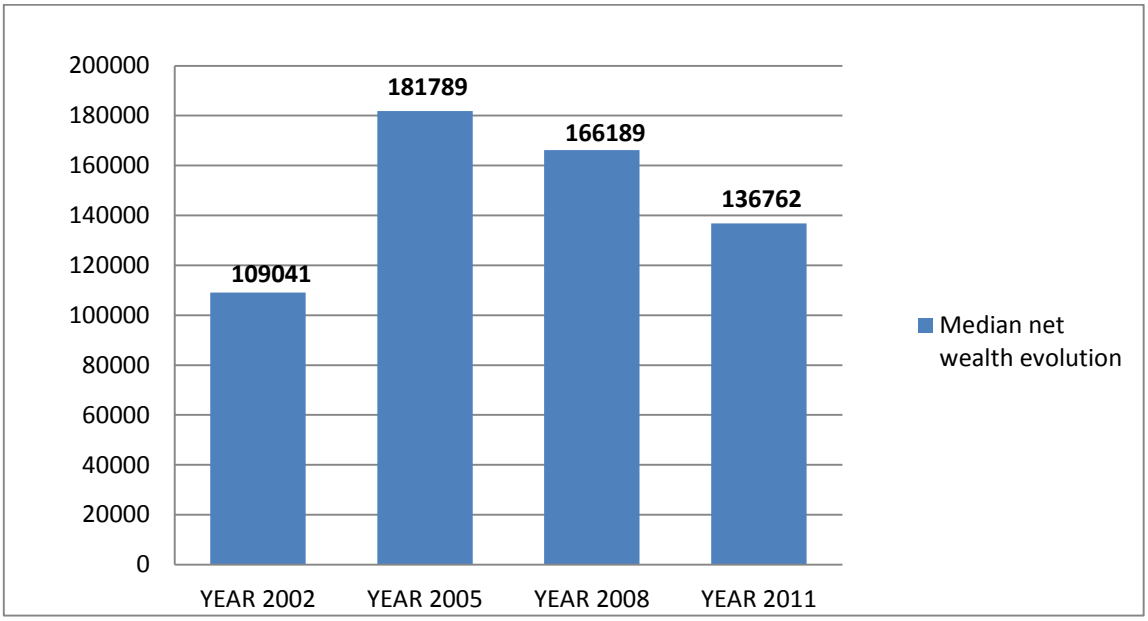
As we can see in Table 1 and in Figure 4, Spanish households' net wealth has evolved unevenly over the period from 2002 to 2011. It increased by approximately 25% in the whole period, rising by about 65% between 2002 and 2005 (from 109.041 to 180.489 Euros in real terms), but decreased after that. In fact median net wealth fell by approximately 8% between 2005 and 2008, and by almost 18% in the period 2008-2011, which corresponds to the first years of the economic crisis.

Table 1: ***Median net wealth (nominal and real terms).***

YEAR	MEDIAN NET WEALTH (nominal value)	CONSUMER PRICE INDEX 2006 (CPI)	MEDIAN NET WEALTH (real value 2006)
2002	**96000**	**88'04**	**109041**
2005	**176291**	**96'976**	**181789**
2008	**177783**	**106'976**	**166189**
2011	**153253**	**112'058**	**136762**

Source: own elaboration data from EFF.

Figure 4: *Median net wealth evolution.*



Source: own elaboration, data from EFF.

Then we proceed to demonstrate if the differences between the median net wealth for each year are significant. To do this, the Mann-Whitney test is used. This test is a nonparametric test applied to two independent samples, and it is used to test for heterogeneity of two ordinal samples. On the one hand, the null hypothesis asserts that the medians in net wealth for two years are identical. On the other hand, the alternative hypothesis asserts that the medians in net wealth for two years are different[2].

In period from 2002 to 2005, using the Mann-Witney test, we obtained a p-value (error probability if the null hypothesis is rejected) equal to 0, which means that for any level of significance, we can reject the null hypothesis, that is, the difference between the median net wealth for 2002 and 2005 is statistically significant.

Between 2005 and 2008, we obtained a p-value equal to 0'029 which means that the difference between the median net wealth for 2005 and 2008 is statistically significant at a 5% significance level.

Finally, in the periods from 2008 to 2011, we obtained a p-value equal to 0'7919, which means that for any level of significance, the null hypothesis cannot be rejected, that is,

[2] Wilcoxon, F., 1945. *Individual Comparisons by Ranking Methods*. Biometrics Bulletin, Vol. 1, No. 6, pp. 80-83

the difference between the median net wealth for 2008 and 2011 is not statistically significant.

In the years before the crisis, there was a noticeable increase in built homes and a high growth of mortgage debt, along with an increase in the importance of the construction industry in GDP and thus an increase in employment in that sector. In 2006 an inflection occurs in advance of mortgage credit and prices start to fall[3]. That was probably why the largest increase in net wealth was produced from 2002 to 2005 by about 65%.

This may be mainly because during the years before the housing bubble, which erupted in 2007 in the United States, some Spanish families purchased new homes, and in general, the value of housing increased. Therefore, it is of significant interest to study how it has evolved wealth with regard to housing, particularly in the period from 2002 to 2005, so we now take into account net wealth without homes of Spanish households and without debts of housing.

Doing the same calculations as above, the figures shown below are in "real Euros in 2006 " to make comparisons between median net wealth excluding housing equity in each of the years. To do this, the value of the main residence and the value of the other properties are subtracted from the variable “net wealth”. On the other hand, in this variable they are added both the value of the outstanding debts from loans used to purchase their main residence and the value of the outstanding debts from loans used to purchase other real estate properties different from the main residence.

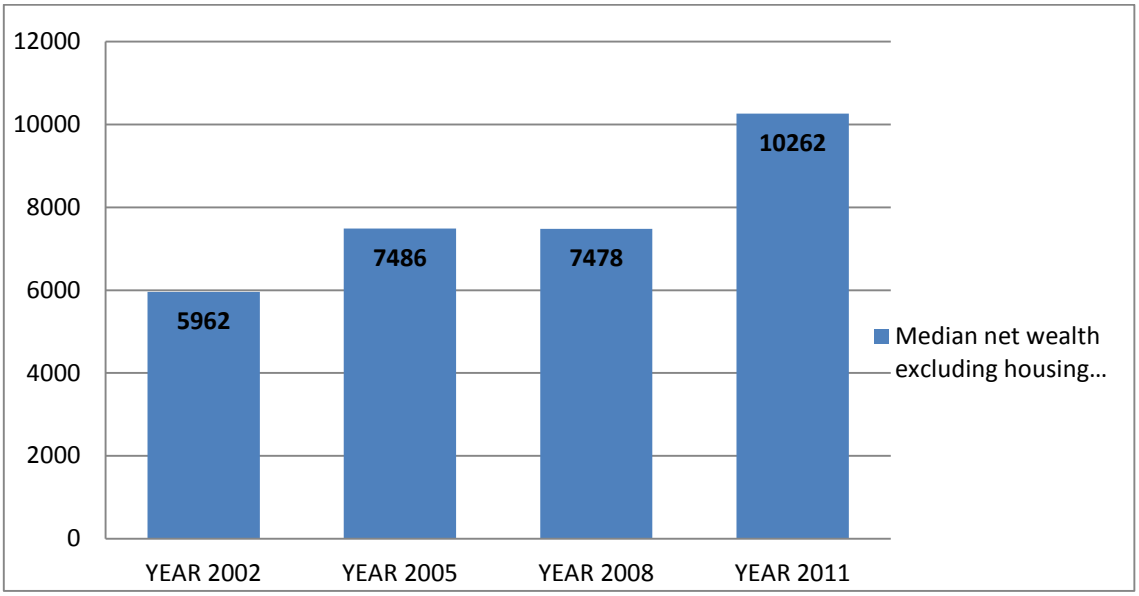
Table 2: ***Median net wealth excluding housing equity (nominal and real terms).***

YEAR	MEDIAN NET WEALTH EXCLUDING HOUSING EQUITY (nominal value)	CONSUMER PRICE INDEX 2006 (CPI)	MEDIAN NET WEALTH EXCLUDING HOUSING EQUITY (real value 2006)
2002	**5249**	**88’04**	**5962**
2005	**7260**	**96’976**	**7486**
2008	**8000**	**106’976**	**7478**
2011	**11.500**	**112’058**	**10262**

Source: own elaboration, data from EFF.

[3] E. Ortega y J. Peñalosa, «Claves de la crisis económica española y retos para crecer en la UEM», Documentos Ocasionales, nº 1201, Banco de España.

Figure 5: *Median net wealth excluding housing equity evolution.*



Source: own elaboration, data from EFF.

Comparing the data obtained previously with the data obtained now, as you can observe, the median net wealth excluding housing is much lower than the median total net wealth in each year, indicating that the main residence of the families and its debts has a significant weight on the net wealth. With regard to the first period of interest (from 2002 to 2005), an important increase in median net wealth net of housing occurs, of approximately a 26%. In the following period, this variable remains practically constant, and in the last period, 2008-2011, the largest increase occurs, exactly by 37%.

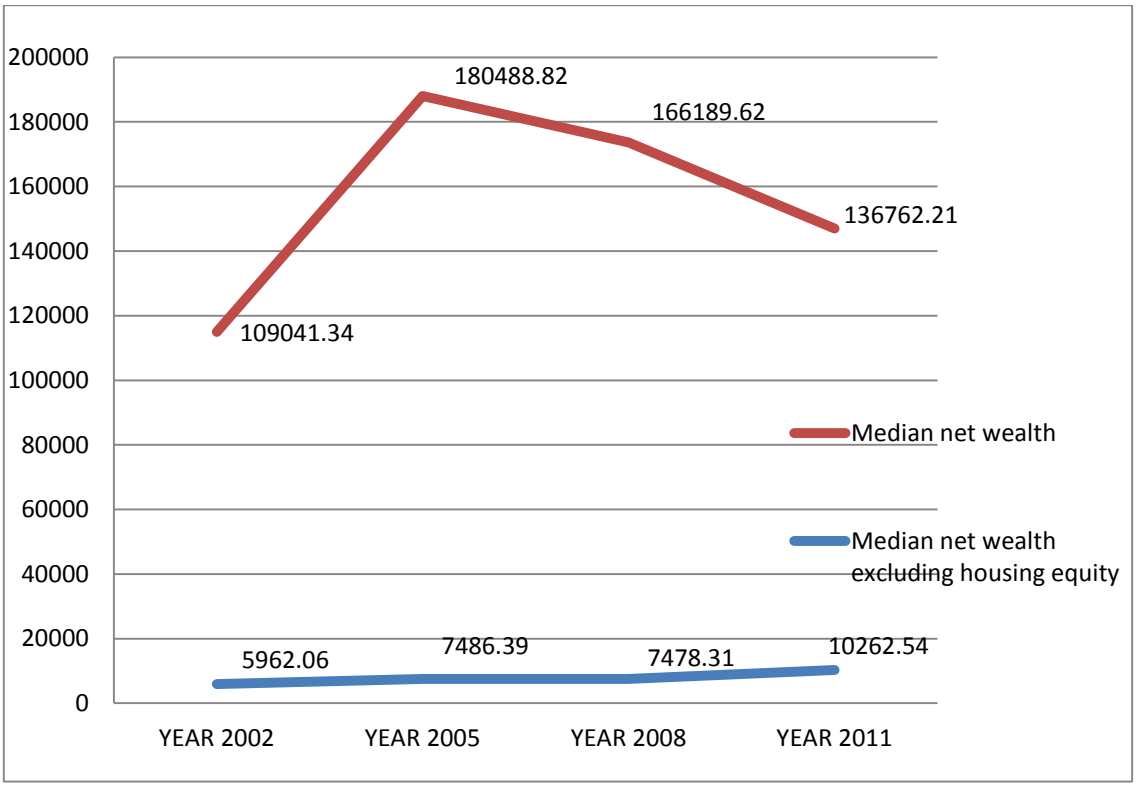
Now, we proceed to demonstrate if the differences between the median net wealth excluding housing equity for each year are significant. As it was carried out previously, to do this, the Mann-Whitney test is used.

In period from 2002 to 2005, using the Mann-Witney test, we obtained a p-value equal to 0, which means that for any level of significance, the null hypothesis is rejected, that is, the difference between the median net wealth excluding housing equity for 2002 and 2005 is statistically significant.

Between 2005 and 2008, we obtained a p-value equal to 0’0159, which means that the difference between the median net wealth excluding housing equity for 2005 and 2008 is statistically significant at a 5% significance level, that is, the null hypothesis is rejected.

Finally, in the periods from 2008 to 2011, we obtained a p-value equal to 0, which means that for any level of significance, the null hypothesis is rejected, that is, the difference between the median net wealth excluding housing equity for 2008 and 2009 is statistically significant.

Figure 6: ***Comparison between evolution of the median net wealth and evolution of the median net wealth excluding housing equity.***



Source: own elaboration data from EFF.

As you can observe from Figure 6, when taking into account housing equity, a more unstable variation occurs, that is, sudden changes in the median net wealth are produced, whereas if we refer only to the change in net wealth without considering housing and related debts, a more stable variation occurs.

Given that between 2002 and 2005 total net wealth increased by 65% while net wealth excluding housing equity increased only by 26%, we deduce that housing has a considerable weight on the net wealth. This fact can be explained on the one hand because of the increasing of the price of housing (with respect to other prices), and because families acquired other properties.

For the period 2002-2005 where it occurs the largest increase in median net wealth, according to data from the Spanish Survey of Household Finances (EFF) housing wealth increased at an average annual rate of 18 % in real terms. About 15% of those 18 percentage points were due to the increase in housing prices. In real terms, the value of housing from about 40% of the population had increased by more than 75%[4]. Moreover, the reason from the increase in housing wealth was because around 3% of the population acquired a new house. Specifically, the 23% of families that only owned the main house acquired a new house, different from the main residence during the period from 2002 to 2005. Consequently, the percentage of families with other properties increased about 4'4%; it passed from 30'1% to 34'5% in this period.

In another way, with respect to the percentage of families who has the main residence, it was stable practically; it passed from 81'9% in 2002 to 81'3% in 2005[5].

To sum up, the weight of housing wealth on total wealth of Spanish households increased from 78'7 % to 80 % for the period from 2002 to 2005, so that the concentration of wealth in real estate assets of Spanish households it is high comparing with other countries. Taking as a reference the years in which there were a comparable data to the EFF, it is showed that in Italy this ratio is around 75% and in the United States increased from 36'7% to 43'4% between the periods from 2001 to 2004[6].

[4] Bank of Spain, 2007. *Encuesta Financiera de las Familias (EFF) 2005: métodos, resultados y cambios entre 2002 y 200*, Boletín Económico, diciembre, Banco de España.
[5] Bover, O., 2008. *Dinámica de la renta y la riqueza de las familias españolas: resultados del panel de la Encuesta Financiera de las Familias (EFF) 2002-2005*, Documentos Ocasionales, nº 0810, Banco de España.
[6] Bover, O.; Martínez, C. and Velilla, P., 2005. *The Wealth of Spanish Households: A Microeconomic Comparison with the United States, Italy and the United Kingdom.* Economic Bulletin, Banco de España.

II. Evolution in inequality

For the study in inequality of wealth we calculated the percentiles 10, 25, 50, 75 and 90 for each year on the variable of net wealth. Percentiles are not central measure used in statistics and indicate, once ordered the data from smallest to largest, the variable value below which there are a percentage of observations in a group of observations. The percentile explains how the value is positioned regarding to the total. For example, the 25 percentile is the value below which there are the 25% of the observations.

In Table 3 we show the net wealth evolution using the 10 percentile, the 25 percentile, the 50 percentile, the 75 percentile and the 90 percentile for each year.

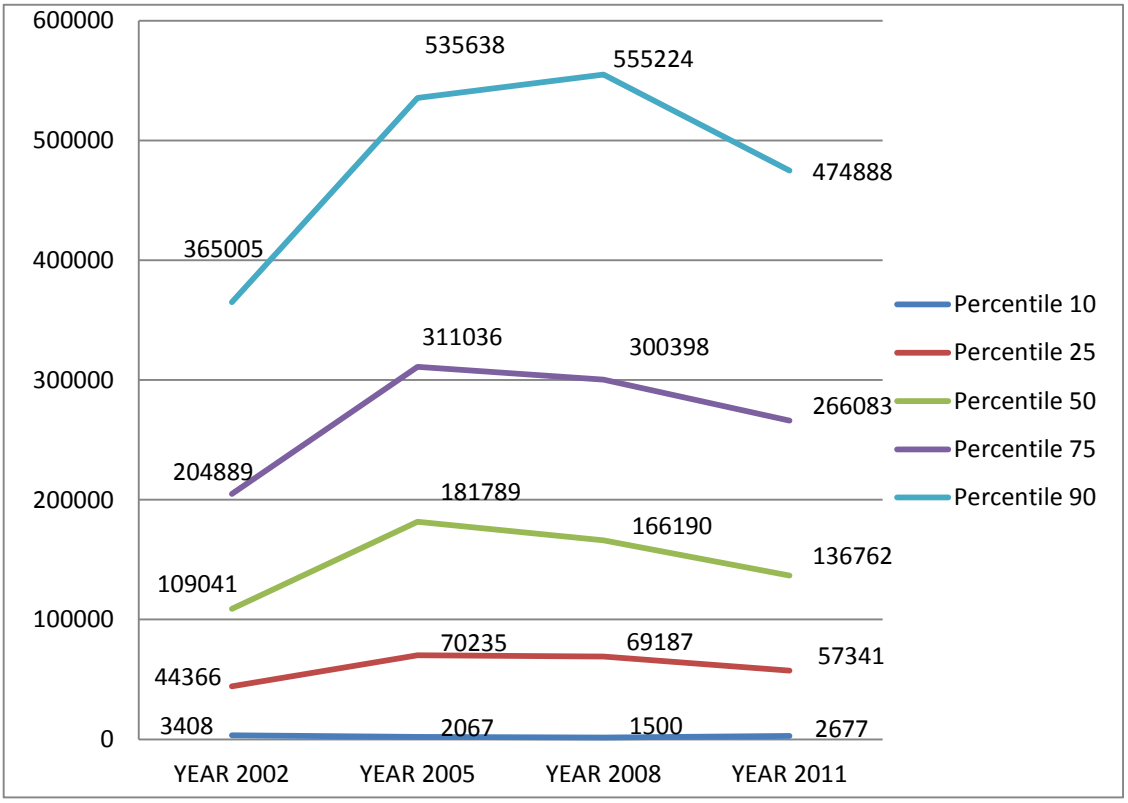
Table 3: ***Percentiles of the net wealth variable in real terms (Euro 2006).***

	YEAR 2002	YEAR 2005	YEAR 2008	YEAR 2011
PERCENTILE 10%	**3408**	**2067**	**1500**	**2677**
PERCENTILE 25%	**44366**	**70235**	**69187**	**57341**
PERCENTILE 50%	**109041**	**181789**	**166190**	**136762**
PERCENTILE 75%	**204889**	**311036**	**300398**	**266083**
PERCENTILE 90%	**365005**	**535638**	**555224**	**474888**

Source: own elaboration, data from EFF.

As you can see in the Table 3, and more clearly in the Figure 6, the inequality of the net wealth measured by the 25, 50, and 75 percentiles increased considerably for the first period (from 2002 to 2005); the 90 percentile increased from 2002 to 2008, and the 10 percentile decreased from 2002 to 2008. The net wealth decreases slightly in the 25, 50 and 75 percentiles from 2005. Exactly, analyzing in more detail the evolution of changes in different parts of the distribution, it can be said that between 2002 and 2011, the 10 percentile was decreased by 20% approximately; the 25 percentile was increased by 30%; the percentile 50 was increased by 25% approximately; and finally, the top percentiles, 75 and 90, increased by 30%.

Figure 7: *Net Wealth evolution by percentiles 10, 25, 50, 75 and 90.*



Source: own elaboration, data from EFF.

This figure shows the unequal distribution of wealth among the Spanish families. In a distribution of wealth that would be equal, it is clear that the percentages of increase in the percentiles would be the same. As we can see in the figure 7, the highest increase of the percentiles occurs in the first period studied (from 2002 to 2005), where the largest increases of the median net wealth occurs. If we compare the evolution of the median net wealth in the previous figure 6, comparing with the evolution of the percentiles in figure 7, we can see that they evolve similarly, driven mainly by the top percentiles.

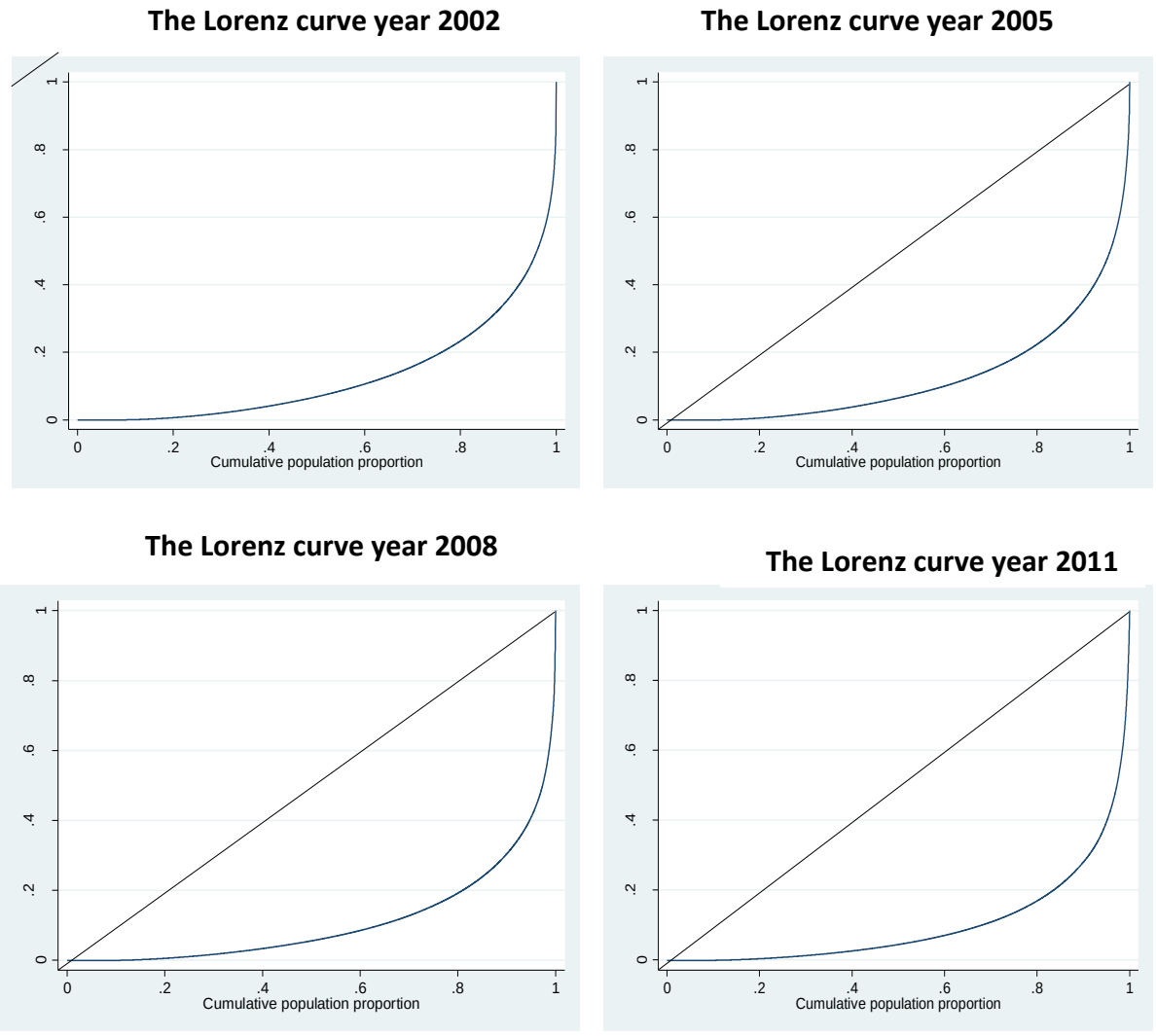
Then we proceed to the analysis of the evolution of each of the percentiles. First, the 10 percentile suffers a significant decrease in the period from 2002 to 2005, decreasing by 40 % approximately. In the following period, a decrease again occurs in the 10 percentile by 25%. For the last period studied, from 2008 to 2011, an increase in this percentile by 80% occurs. With regard to the 25 percentile, it only increases in the first period by 60%. From 2005 to 2008, the 25 percentile remains practically constant, and in the last period, it decreases by 15%. Now, for the 50 percentile, in the first period an increase by 67% occurs, from 2005 to 2008 the 50 percentile decreases by 10%, and in the last period it decreases more than in the previous period, exactly by 17%. With

respect to the 75 percentile, in the first period it increases by 50%; from 2005 to 2008 suffers a slight decrease by 4%; and in the last period the 75 percentile decreases by 12%. Finally, the 90 percentile increases in the first period by approximately 47%; in the period from 2005 to 2008 it increases by 4%, and finally in the last period studied, the 90 percentile decreases by 15%.

To analyze how wealth inequality evolves over time, it is necessary to use statistics like the Lorenz curve, the Gini coefficient or the ratio between 90 and 10 percentile and the ratio between 90 and 50 percentile.

Figure 8 shows the Lorenz curve for Spanish total net wealth in years 2002, 2005, 2008 and 2011. Specifically, the Figure 8 is the graphical representation of the previous table 3 (percentiles) for each of the years.

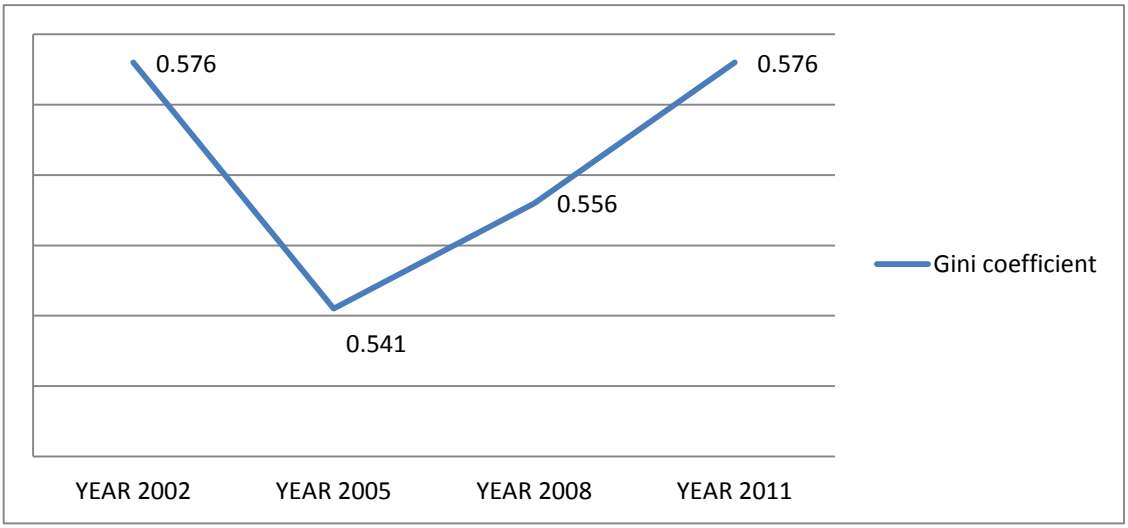
Figure 8: ***The Lorenz curve for the years.***



Source: Stata program, data from EFF.

Figure 8 shows the evolution of the Gini coefficient. The highest levels in inequality were reached in the years 2002 and 2011. Wealth inequality decreased between 2002 and 2005 and increased in the following period, arriving in 2011 at the same level in inequality in 2002, as we show in Figure 9.

Figure 9*: Gini coefficient evolution of the net wealth.*



Source: own elaboration, data from EFF.

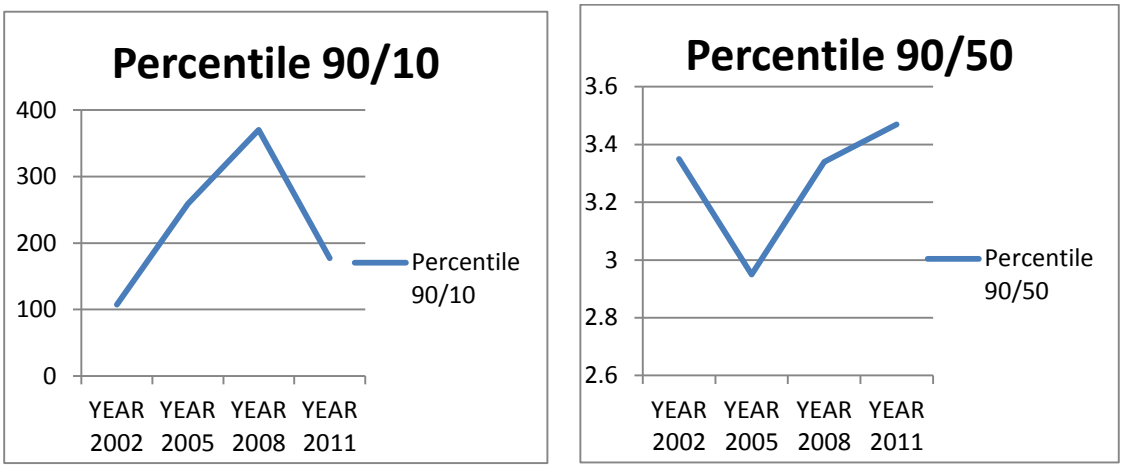
Figure 10 shows the inequality of the net wealth measured as the ratio between 90 and 10 percentile and measured as the ratio between 90 and 50 percentile.

Table 4: *Percentile 90/10 and 90/50 of the net wealth evolution.*

	PERCENTILE 90/10	PERCENTILE 90/50
YEAR 2002	**107'10**	**3,35**
YEAR 2005	**259'14**	**2,95**
YEAR 2008	**370'15**	**3,34**
YEAR 2011	**177'40**	**3,47**

Source: own elaboration, data from EFF.

Figure 10: ***Evolution of the ratio between 90/10 and 90/50 percentiles of the net wealth.***



Source: own elaboration, data from EFF.

As you can see in the Figure 12, the inequality of the net wealth measured as the ratio between percentiles 90 and 10 increases from 2002 to 2008. Between 2008 and 2011, the ratio 90/10 decreases dramatically. In contrast, the ratio 90/50 decreases from 2002 to 2005, and it increases from 2005 to 2011. Comparing both ratios, as we can see, the 90/10 ratio is higher than the 90/50 ratio for each year, which means that the levels in inequality are higher among the 90% of the richest population and the 10% of the poorest population.

Regarding to the ratio 90/10, from the financial crisis (that is from 2008), the difference between 90% of the richest population compared to the 10% of the poorest population, has declined, which means that the inequality has decreased. However, the ratio 90/50 increases from the financial crisis, which means that there is a greater difference between the 90% of the richest population with respect to the 50% of the poorest population.

According to a report published in May 2015 and prepared by the Research Department of La Caixa from the LFS (Labor Force Survey) and from the Quarterly Survey of Weekdays costs from the National Institute of Statistics, the seven years of the crisis have caused, among other consequences, a large loss of jobs , especially for the middle class , also reducing their wages. The number of employed of the middle

class has decreased over the years by 35% , more than it has decreased in the upper and lower class[7] .

As has been said before, when is not taken into account the housing equity in the variable net wealth, it occurs a more stable variation. For this reason, now we are going to calculate the inequality indices calculated above to see if this is true. To do this it is used inequality methods like the percentiles, the Gini coefficient and the percentiles ratios between 90/10 and 90/50.

In the next table it is shown the net wealth evolution excluding housing equity using the 10 percentile, the 25 percentile, the 50 percentile, the 75 percentile and the 90 percentile for each year.

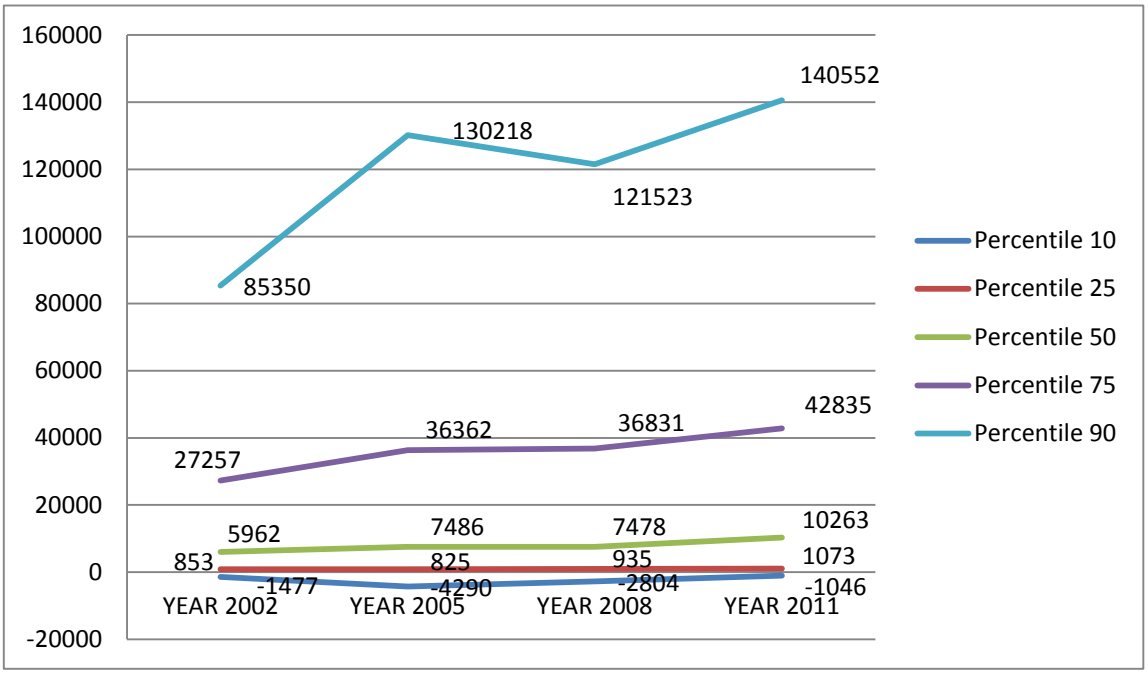
Table 5: ***Percentiles of the net wealth excluding housing equity in real terms (Euros 2006).***

	YEAR 2002	YEAR 2005	YEAR 2008	YEAR 2011
PERCENTILE 10%	**-1477**	**-4290**	**-2804**	**-1046**
PERCENTILE 25%	**853**	**825**	**935**	**1073**
PERCENTILE 50%	**5962**	**7486**	**7478**	**10262**
PERCENTILE 75%	**27257**	**36362**	**36831**	**42835**
PERCENTILE 90%	**85350**	**130218**	**121523**	**140552**

Source: own elaboration, data from EFF.

[7] Maqueda, A., 2015. *Los siete años de crisis se llevan por delante un tercio de la clase media en España.*

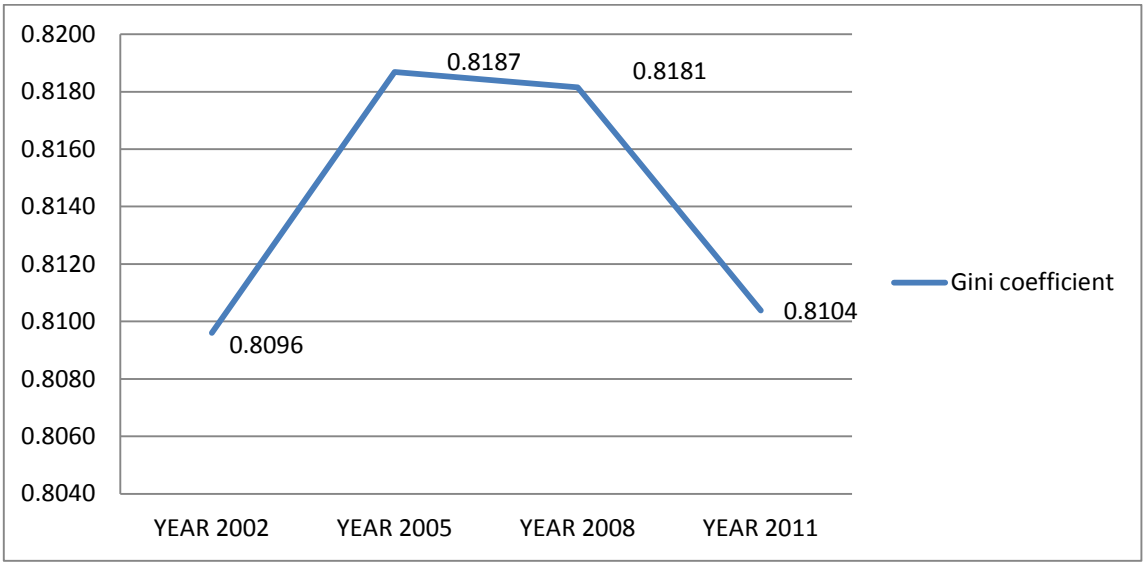
Figure 11: ***Net Wealth evolution excluding housing equity by percentiles.***



Source: own elaboration, data from EFF.

This figure shows the unequal distribution of wealth among the Spanish families. As we can see in the figure 11, the highest increase of the percentiles occurs in the first period studied (from 2002 to 2005) and in the last period studied (2008-2011), where the largest increases of the median net wealth excluding housing equity occurred. If we compare the evolution of the median net wealth in the previous Figure 5, comparing with the evolution of the percentiles in Figure 11, we can see that they evolve similarly. In the period from 2005 to 2008, the net wealth excluding housing equity was practically constant, and if we observe the evolution of the percentiles, in this period, the percentile evolve practically constant. And finally, from 2008 the net wealth excluding housing equity has increased, especially for the two top percentiles.

Figure 12*: Gini coefficient evolution in the net wealth excluding housing equity.*



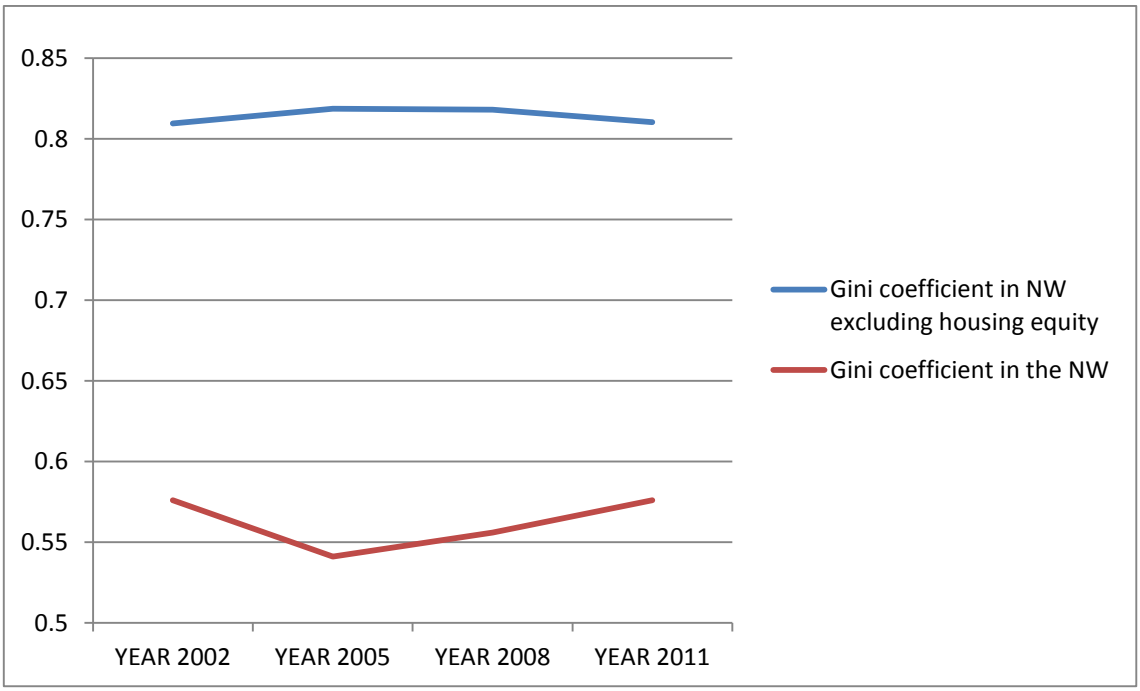
Source: own elaboration, data from EFF.

As we show in Figure 12, the highest levels in inequality were reached in the year 2005. Wealth inequality excluding housing equity has increased between 2002 and 2005 and decreased in the following periods. Particularly, the inequality has decreased moderately from 2005 to 2008, but in the period between 2008 and 2011, the inequality of the net wealth excluding housing equity has decreased at a higher rate than in the previous period.

Looking the Figure 13, we can see that when the housing equity is considered, there are lower levels in inequality, but also a more unstable evolution. When the housing equity is considered in the net wealth, inequalities decreases because housing has a considerable weight on the net wealth and it is considered that a high percentage of families have their own housing. As shown in the above figure, the net wealth excluding housing equity inequalities decreased in the period from 2002 to 2005 in which, as stated above, there was a higher homeownership by families.

In contrast, when the housing equity is excluded from the net wealth variable (blue line in Figure 13), there are high levels in inequality and it is more stable.

Figure 13: ***Comparison between Gini coefficient evolution of the net wealth and Gini coefficient evolution of net wealth excluding housing equity.***



Source: own elaboration, data from EFF.

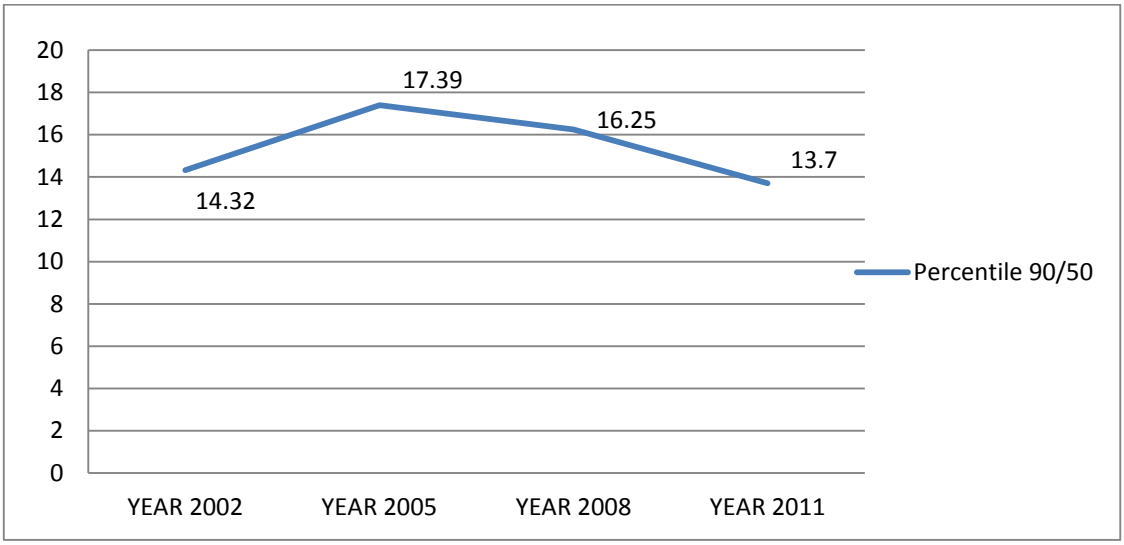
As we calculated above, the 10 percentile is negative and for this reason, the 90% of the population is infinitely richer than the 10 % of the poorest population. So that, the Table 5 shows the inequality of the net wealth measured as the ratio between 90 and 50 percentile. Figure 14 shows the evolution of this ratio.

Table 6*: Ratio P90/P50 of the net wealth excluding housing equity.*

	PERCENTILE 90/50
YEAR 2002	**14,32**
YEAR 2005	**17,39**
YEAR 2008	**16,25**
YEAR 2011	**13,70**

Source: own elaboration, data from EFF.

Figure 14: ***Evolution of the ratio between 90/50 percentile of the net wealth excluding housing equity.***



Source: own elaboration, data from EFF.

As you can see in the Figure 14, the inequality of the net wealth as measured as the ratio between percentiles 90 and 50 has increased from 2002 to 2005. Between 2005 and 2011, the ratio 90/50 decreases, specially from 2008. The levels in inequality are lower among the 90% of the richest population and the 50% of the poorest population in comparision to the 90% of the richest population and the 10% of the poorest population.

6. Conclusions

Considering the objectives proposed at the beginning, with this research I have tried to show how it the net wealth has evolved in the period from 2002 to 2011. The clearer finding is that the median net wealth has evolved unevenly over this period; it has increased by approximately 25% in the whole period (2002-2011), specially from 2002 to 2005, when the highest increase of the median net wealth occurred (it had an increase by approximately 65%). From 2005, the median net wealth decreased, concretely in the period which corresponds to the first years of the economic crisis, which covers from 2008 to 2011.

On the years before the economic crisis, there was a noticeable increase in the built homes and a high growth of mortgage debt due to strong worth of the construction sector. That is reason why from 2002 to 2005, the median net wealth increased dramatically.

We analyze how wealth evolved with regard to housing, especially in the period from 2002 to 2005, that is, the evolution of the net wealth excluding housing equity (without houses of Spanish families and without debts of housing). The obtained results are that the median net wealth excluding housing equity is much lower than the median total net wealth on each year, indicating that the main residence of the families and their debts have a significant weight on the net wealth. It can be deduced that the evolution of the median net wealth excluding net housing between 2002 and 2005 may be due because in these periods the housing wealth of the families increased significantly. This fact can be explained on the one hand because the price of housing increased, or on the other hand because families acquired other properties.

In order to know how the inequality of wealth has evolved from 2002 to 2011, in this investigation the 10, 20, 50, 75 and 90 percentiles, the Gini coefficient, the ratio between 90 and 10 percentile and the ratio between 90 and 50 percentile have been used. On the one hand, the percentiles and the median net wealth evolve similarly, especially in the top percentiles. The highest increase of the percentiles occurs in the first studied period (from 2002 to 2005) like in the net wealth evolution. Regarding the Gini coefficient, it has the highest decrease in the period from 2002 to 2005. In the next period, 2005-2008, the Gini coefficient has an important increase which means that the inequality of wealth in Spain increases. Finally, in the last studied period, the inequality of wealth has the highest increase. This evolution of the Gini coefficient can be

explained because on the period before the crisis, due to the increased of housing wealth of the families, the net wealth inequalities decreased. With respect to the ratio between 90 and 10 percentile and the ratio between 90 and 50 percentile, the 90/10 ratio is higher than the 90/50 ratio for each year, what means that the levels in inequality are higher among the 90% of the richest population and the 10% of the poorest population. For the 90/10 ratio, from the financial crisis, the difference between 90% of the richest population compared to the 10% of the poorest population, has declined, what means that the inequality has decreased. However, the ratio 90/50 has increased from the financial crisis, which means that the middle class is the most affected by the financial crisis.

With respect to the study of the evolution the inequality of the net wealth excluding housing equity, the highest increases of the percentiles occurs from 2002 to 2005, what means that the median net wealth excluding housing equity and the percentiles evolved similarly. Regarding to the Gini coefficient of the net wealth excluding housing equity, the highest levels in inequality were in 2005. The inequality has increased between 2002 and 2005 and decreased in the following periods. With respect to the 90/10 ratio, as it has been calculated, the 10 percentile is negative, what means that the 90% of the population is infinitely richer than the 10 % of the poorest population. The levels in inequality are lower among the 90% of the richest population and the 50% of the poorest population in comparison to the 90% of the richest population and the 10% of the poorest population.

Comparing the net wealth and the net wealth excluding housing equity, there are low levels in inequality when the housing equity is considered, which can be explained because housing has a considerable weight on the net wealth and it is considered that a high percentage of families have their own housing. The net wealth excluding housing equity inequalities decreased in the period where there was a higher homeownership by families, that is from 2002 to 2005. In contrast, if the housing equity is excluded from the net wealth variable, there are high levels in inequality.

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